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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/693,142 | 10/24/2003 | Steven E. Reder | 03-0872 | 1744 |

24319 7590 05/10/2006

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| EXAMINER |
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ALEXANDER, MICHAEL P

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| ART UNIT | PAPER NUMBER |
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1742

DATE MAILED: 05/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|---|-------------------------------------|--|
| Office Action Summary | Application No. 10/693,142 | Applicant(s) REDER ET AL. | |
| | Examiner Michael P. Alexander | Art Unit 1742 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 7-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 7-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim(s) 7-15 is/are pending.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6 May 2006 has been entered.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 7-9, 11 and 13-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Doan (US 2002/0061714).

Regarding claim 7, Doan teaches (Fig. 1, 0019, 0023) a method for thinning a layer (16) on a substrate (14) without damaging a delicate layer (15) underlying a layer to be thinned, the method comprising the steps of: bringing the substrate (14) completely into a bath (30) of the electrolyte solution, and forcing an electropolishing pad (22) that is mounted completely within the bath (30) of the electrolyte solution (30) against the layer (16) on the substrate (14) while applying a desired voltage potential

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through the electrolyte solution (30) between the substrate (14) and the electropolishing pad (22), with both the substrate (14) and the electropolishing pad (22) entirely surrounded by the electrolyte solution (30), where the layer is thinned both physically by the electropolishing pad and electrolytically by the voltage potential applied through the electrolyte solution.

Regarding claim 8, Doan teaches (0019) that the electrolyte solution would be an abrasive solution.

Regarding claim 9, Doan teaches (0015) that the substrate is a semiconductor substrate including integrated circuits.

Regarding claim 11, Doan teaches (0002) that the layer comprises copper.

Regarding claim 13, Doan teaches (Fig. 1) that the electropolishing pad (22) has a diameter smaller than the diameter of the substrate (14).

Regarding claims 14-15, Doan teaches (Fig. 1) that the pad and the substrate are both moved relative to each other.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

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1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Doan as applied to claim 7 above and further in view of Watts (US 5,897,375).

Regarding claim 10, Doan does not specify providing a first electrically conductive layer, an underlying non electrically conductive barrier layer, and an intervening seed layer. However, Watts teaches (col. 3 line 56 - col. 4 line 20), in a method of chemical mechanical polishing to produce an integrated circuit, providing a barrier layer in order to ensure that copper within subsequent metallization regions is properly contained and forming a seed layer in order to function as a seed for subsequent electroplating of copper. It would have been obvious to one of ordinary skill in the art to modify the method of Doan by providing a barrier layer in order to ensure that copper within subsequent metallization regions is properly contained and forming a seed layer in order to function as a seed for subsequent electroplating of copper as taught by Watts.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Doan as applied to claim 7 above, and further in view of Chen (2002/0119286).

Regarding claim 12, Doan does not specify the voltage applied. However, Chen teaches (0143-0145), in a method of electrochemical mechanical polishing, applying a voltage of about 0.1 volts to about 10 voltages in order to dissolve the copper containing material from the substrate. It would have been obvious to one of ordinary skill in the

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art to modify the method of Doan by applying a voltage of about 0.1 volts to about 10 voltages in order to dissolve the copper containing material from the substrate as taught by Doan.

Response to Arguments

Applicant's arguments with respect to claims 7-15 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael P. Alexander whose telephone number is 571-272-8558. The examiner can normally be reached on M-F 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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